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| EXAMINER | |
|---|---|
| ABDI, AMARA | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/723,736 | AVINASH, GOPAL B. | |
| | Examiner | Art Unit | |
| | Amara Abdi | 2624 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *26 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 November 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

- Reference character **94** in **figure 4** was not mentioned in the specification.
- Reference character **118** in **figure 6** was not mentioned in the specification.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Objections*

2. Claim 9 is objected to because of the following informalities:

(1) Claim 9, line 15, "**the** mask" should be changed to "**a** mask".

Appropriate correction is required.

### *Claim Rejections - 35 USC § 101*

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 19 and 24-26 are rejected under U.S.C. 101 because the claimed invention is directed to non- statutory subject matter.

5. The claimed invention is directed to non-statutory subject matter. Claims 9 and 24-26 are rejected. In claim 9, "computer code in appropriately programmed computer system" must be "computer readable medium encoded with a computer program' in order to be statutory.

In claims 24-26, "a computer program" must be " a computer readable program storing a computer program" in order to be statutory.

### *Claim Rejections - 35 USC § 103*

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-5,8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa et al. (US 5,673,332) in view of Maruo (US 6,292,583).

**(1) Regarding claim 1:**

Nishikawa et al. disclose a method for processing image data (column 1, line 16-17) comprising:

Processing input data by identifying feature of interest to produce processed image data (column 7, line 50-55; and column 8, line 64-66), (the identifying of the feature of interest is read as the detection of the location of clusters); and

performing spike noise dependent blending of data derived from the input image data with the processed image data (column 21, line 37-48), (the term blending is read as combining or associating).

Nishikawa et al. does not explicitly mention the characterizing of the spike noise in the input image data.

Maruo, in analogous environment, teaches an image information processing apparatus; where the spike shaped noise in the input image is detected by wavelet transform S1 as an edge (column 9, line 64-66), (the word characterizing is read as detecting)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Maruo, where the spike noise is characterized in the input image data, in the system of Nishikawa et al. in order to detect a defect on a device at high speed from an image thereof to be inspected without spending a prodigious amounts of processing time, unlike Fast Fourier Transform (FFT) method (column 3, line 20-24).

**(2) Regarding claim 2:**

Nishikawa et al. further disclose the method, where the spike noise is characterized by rank-order filtering the input image data (column 21, line 43-48; and column 24, line 33-36).

**(3) Regarding claim 3:**

Nishikawa et al. further disclose the method, where the spike noise is characterized by computing an absolute difference between the rank-order filter input image data and the input image data (column 21, line 42-43), (the examiner interpreted the computing of an absolute difference between the rank-order filter input image data and the input image data as the same concept as the absolute difference produced by the combining of the results of erosion and dilatation operation).

**(4) Regarding claim 4:**

Nishikawa et al. further disclose the method, where the spike noise is characterized by generating a multi-level mask of spike noise likelihood based upon the absolute difference (column 4, line 42-49), (the multi-level mask is read as erosion or dilation using grators)

**(5) Regarding claim 5:**

Nishikawa et al. further disclose the method, where the rank-order filtered input image data is blended with the processed image data (column 17, line 5-9), (the examiner interpreted the blending of the rank-order filtered input image data with the processed image data as the same concept as the combining of the filtering signal enhancement filter and signal suppression filter to produce a difference images).

**(6) Regarding claim 8:**

Nishikawa et al. disclose a method for processing image data (column 1, line 16-17) comprising:

Processing input data by identifying feature of interest to produce processed image data (column 7, line 50-55; and column 8, line 64-66), (the identifying of the feature of interest is read as the detection of the location of clusters);

rank-order filtering the input image data (column 21, line 43-48; and column 24, line 33-36), computing an absolute difference between the rank-order filtered input image data and the input image data (column 21, line 42-43), and generating a multi-level mask of spike noise likelihood based upon the absolute difference (column 4, line 42-49), and

performing spike noise dependent blending of data derived from the input image data with the processed image data (column 21, line 37-48), (the term blending is read as combining or associating).

Nishikawa et al. does not explicitly mention the characterizing of the spike noise in the input image data.

Maruo, in analogous environment, teaches an image information processing apparatus; where the spike shaped noise in the input image is detected by wavelet transform S1 as an edge (column 9, line 64-66), (the word characterizing is read as detecting).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Maruo, where the spike noise is characterized in the input image data, in the system of Nishikawa et al. in order to

detect a defect on a device at high speed from an image thereof to be inspected without spending a prodigious amounts of processing time, unlike Fast Fourier Transform (FFT) method (column 3, line 20-24).

**(7) Regarding claim 10:**

Nishikawa et al. further disclose the method, where the features of interest include structural regions defined by the input image data (column 14, line 48-54), (the structural regions are read as the related regions, which are part of the small square region of interests ROIs).

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa et al. and Maruo, as applied to claim 1 above, and further in view of Hsieh (US 6,009,140).

Nishikawa et al. and Maruo disclose all the subject matter as described in claim 1 above.

Nishikawa et al. and Maruo do not explicitly mention the method, where blending via a first weighting factor is performed on discrete picture elements determined not to exhibit spike noise, and blending via at least one second weighting factor is performed on discrete picture elements determined to exhibit spike noise.

Hsieh, in analogous environment, teaches a stair-case suppression for computed tomography imaging, where the probability that spike noise will be erroneously considered as high density objects is determined within the boundary (column 2, line 15-17), (the examiner interpreted that by using the probability, the blending is

determined to display or not the spike noise, also the discrete picture is read as a CT imaging)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Hsieh, where determining the probability to reduce the spike noise in the input image data, in the system of Nishikawa et al. in order to provide a correction algorithm which is effective in correcting images for stair case type artifacts in dental scans. It also provides such algorithm, which enables reducing the motion effect within each tomographic slice without increasing the discontinuity between slices (column 1, line 58-63).

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa et al. and Maruo, as applied to claim 1 above, and further in view of Brothers et al. (US-PGPUB 2003/0128374).

Nishikawa et al. and Maruo disclose all the subject matter as described in claim 1 above.

Nishikawa et al. and Maruo do not explicitly mention the method, where the data derived from the input image data is determined by shrinking an input image by a desired factor and interpolating the resulting image to the size of the input image

Brothers et al., in analogous environment, teaches a system and method for scaling an image, where removing the selected pixels from the scan line to shrink the scan line to a desired size (paragraph [0032], line 3-5), and the pixels selected from removal in a scan line can be based on received scaling value S, where (S<1)

(paragraph [0032], line 19-21), (the examiner interpreted the interpolation of the resulting image to the size of the input image as the same concept as the scaling of the image to the desired size change of the image).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Brothers et al., where shrinking an input image, in the system of Nishikawa et al. in order to provide more efficient image processing methods for compensating for image distortion (paragraph [0007], line 8-11), and allows a system, such as a printer driver, to simultaneously receive, process and output small groups of scan lines of an image set without storing the entire file (paragraph [0013], line 8-12).

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa et al. and Maruo, as applied to claim 1 above, and further in view of Nakabayashi et al. (US 7,113,306).

Nishikawa et al. disclose all the subject matter as described in claim 1 above.

However, Nishikawa et al. does not explicitly mention the method, where a mask encodes weighting factors.

Nakabayashi et al., in analogous environment, teaches an image data processing apparatus and image data processing method, where the mask sets a central value to the weighting of a pixel to be processed in the image data (column 22, line 46-48).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Nakabayashi et al., where the weighting factors are set by mask, in the system of Nishikawa et al. in order to provide an image data processing apparatus capable of referring to a result obtained by easily carrying out an image processing while maintaining the originality of image data (column 1, line 48-51).

11. Claims 11-16, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa et al. in view of Hsieh (US 6,009,140).

**(1) Regarding claim 11:**

Nishikawa et al. disclose the method for processing image data (column 1, line 16-17) comprising:

Processing input image data by identifying features of interest to produce processed image data (column 7, line 50-55; and column 8, line 64-66); and

Blending data derived from the input image data with the processed image data (column 21, line 37-48) via weighting factors (column 31, line 29-33).

However, Nishikawa et al. does not explicitly mention the determining of likelihood that discrete picture elements in the input image data exhibit spike.

Hsieh, in analogous environment, teaches a stair-case suppression for computed tomography imaging, where the probability that spike noise will be erroneously considered as high-density objects is determined within the boundary (column 2, line

15-17), (the likelihood is read as a probability, and discrete picture is read as a CT imaging).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Hsieh, where determining the probability to reduce the spike noise in the input image data, in the system of Nishikawa et al. in order to provide a correction algorithm which is effective in correcting images for stair case type artifacts in dental scans. It also provides such algorithm, which enables reducing the motion effect within each tomographic slice without increasing the discontinuity between slices (column 1, line 58-63).

**(2) Regarding claims 12-14:**

Nishikawa et al. disclose all the subject matter as described in claims 2,3, and 4 above.

Nishikawa et al. does not explicitly mention the likelihood.

Hsieh, in analogous environment, teaches a stair-case suppression for computed tomography imaging, where linear interpolation is utilized to determine the boundary, and to reduce the probability that's pike noise will be erroneously considered as high density objects (column 2, line 15-16), (the likelihood is read as a probability).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Hsieh, where determining the probability to reduce the spike noise in the input image data, in the system of Nishikawa et al. in order to provide a correction algorithm which is effective in correcting images for stair case type artifacts in dental scans. It also provides such algorithm, which enables reducing

the motion effect within each tomographic slice without increasing the discontinuity between slices (column 1, line 58-63).

**(3) Regarding claim 15:**

Nishikawa et al. further disclose the method, where the rank-order filtered input image data is blended with the processed image data (column 17, line 5-9), (the examiner interpreted the blending of the rank-order filtered input image data with the processed image data as the same concept as the combining of the filtering signal enhancement filter and signal suppression filter to produce a difference images).

**(4) Regarding claim 16:**

Nishikawa et al. disclose all the subject matter as described in claim 11 above.

Nishikawa et al. does not explicitly mention the method, where blending via a first weighting factor is performed on discrete picture elements determined not to exhibit spike noise, and blending via at least one second weighting factor is performed on discrete picture elements determined to exhibit spike noise

Hsieh, in analogous environment, teaches a stair-case suppression for computed tomography imaging, where the probability that spike noise will be erroneously considered as high density objects is determined within the boundary (column 2, line 15-17), (the examiner interpreted that by using the probability the blending is determined to display the spike noise or to not, interpreted the discrete picture is read as a CT imaging)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Hsieh, where determining the probability to

reduce the spike noise in the input image data, in the system of Nishikawa et al. in order to provide a correction algorithm which is effective in correcting images for stair case type artifacts in dental scans. It also provides such algorithm, which enables reducing the motion effect within each tomographic slice without increasing the discontinuity between slices (column 1, line 58-63).

**(5) Regarding claim 18:**

Nishikawa et al. disclose a system (column 3, line 36) for processing image data (column 1, line 16-17) comprising:

a memory circuit for storing input image data (column 9, line 18-20); (the examiner interpreted that it's obvious that the computer includes a memory circuit for storing input image data);

A processing module for processing the input image data to generate processed image data (column 8, line 17-22); and

spike noise blending module configured to blend data derived from the input image data with the processed image data (column 21, line 37-48) via weighting factor (column 31, line 29-33).

Nishikawa et al. does not explicitly mention the system, where determining a likelihood that discrete picture elements in the input image data exhibit spike noise

Hsieh, in analogous environment, teaches a stair-case suppression for computed tomography imaging, where the probability that spike noise will be erroneously considered as high density objects is determined within the boundary (column 2, line

15-17), (the likelihood is read as a probability, and discrete picture is read as a CT imaging).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the system of Hsieh, where determining the probability to reduce the spike noise in the input image data, in the system of Nishikawa et al. in order to provide a correction algorithm which is effective in correcting images for stair case type artifacts in dental scans. It also provides such algorithm, which enables reducing the motion effect within each tomographic slice without increasing the discontinuity between slices (column 1, line 58-63).

**(5) Regarding claim 19:**

Nishikawa et al. further disclose the system, where the processing module and the blending module are defined by computer code in an appropriately programmed computer system (column 3, line 60-64), (the usage of a computer-aided design is read defining the processing module and the blending module).

**(6) Regarding claim 20:**

Nishikawa et al. further disclose the system, further comprising an image acquisition system for generating an input image data (Figure 39, column 3, line 41-43), (the acquisition system is read as X-ray radiation).

12. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa et al. and Hsieh, as applied to claim 11 above, and further in view of Brothers et al. (US-PGPUB 2003/0128374).

Nishikawa et al. and Hsieh disclose all the subject matter as described in claim 11 above.

Nishikawa et al. and Hsieh do not explicitly mention the method, where the data derived from the input image data is determined by shrinking an input image by a desired factor and interpolating the resulting image to the size of the input image

Brothers et al., in analogous environment, teaches a system and method for scaling an image, where removing the selected pixels from the scan line to shrink the scan line to a desired size (paragraph [0032], line 3-5), and the pixels selected from removal in a scan line can be based on received scaling value S, where (S<1) (paragraph [0032], line 19-21), (the examiner interpreted the interpolation of the resulting image to the size of the input image as the same concept as the scaling of the image to the desired size change of the image).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the method of Brothers et al., where shrinking an input image, in the system of Nishikawa et al. in order to provide more efficient image processing methods for compensating for image distortion (paragraph [0007], line 8-11), and allows a system, such as a printer driver, to simultaneously receive, process and output small groups of scan lines of an image set without storing the entire file (paragraph [0013], line 8-12).

## *Conclusion*

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Samara et al. (US-PGPUB 2004/0161139) disclose an image data navigation method and apparatus.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amara Abdi whose telephone number is (571) 270-1670. The examiner can normally be reached on Monday through Friday 7:30 Am to 5:00 PM E.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wu Jingge can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Amara Abdi
05/25/2007

JINGGE WU
SUPERVISORY PATENT EXAMINER